WATER RESOURCES

Sub-Element of the General Plan

1996 Update

City of Sunnyvale

Adopted by City Council

on July 23, 1996

ACKNOWLEDGMENTS

City Council

Robin Parker, Mayor
Landon Curt Noll, Vice-Mayor
Stan J. Kawczynski
Jim Roberts
Manuel Valerio
Patricia Vorreiter
Jack Walker

Planning Commission

Nancy Walker, Chair
Vicki Piazza, Vice-Chair
Gerald Glaser
Mark O'Connor
Creighton Bricker
John Howe
Michael Szymanski

City Staff Contributing to the Sub-Element

Thomas F. Lewcock, City Manager and
the Members of the Planning and Economic Development Review Committee
Ron Caton, Supervising Accountant
Gerri Langtry, Associate Planner
Gail Price, Principal Planner
Dan Rich, Assistant to the City Manager

Consultant

Olivia L. Chen, P.E.
Olivia Chen Consultants
San Francisco, California

Public Works Department Staff Contributing to the Sub-Element

Mike Chan, Administrative Services Manager
Helen Farnham, Environmental Division Manager
Dee Gilcrease, Senior Office Assistant
Pam Morrison, Administrative Aide
Marvin Rose, Director of Public Works
Linda Waterman, Water Supply Supervisor
Bill Weisend, Superintendent of Field Services (retired)

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EXECUTIVE SUMMARY

Purpose and Scope

Since the original Water Resources Sub-Element was adopted by the City Council in 1986, several fundamental changes in the need for water supply, how water is used, and increasing regulatory and environmental constraints on both water supply and water quality have taken place. This update incorporates these fundamental changes to give a clearer vision of the future of water resources. The Executive Summary has been designed to give the reader an overview of key issues discussed in the main body of the Sub-Element, contained in pages 12-70.

The Water Resource Sub-Element establishes integrated goals, policies, and actions designed to:

(1) manage future demands for water
(2) ensure that water distribution systems function properly
(3) provide for comprehensive potable water demand management
(4) maintain financially stable revenue sources
(5) ensure that water meets all quality and health standards
(6) provide a customer service program that emphasizes satisfaction and confidence

Key issues covered in this document include:

(a) state and regional water resources interdependencies
(b) managing demand for water in an era of uncertain supplies
(c) conservation policies developed as a result of the recent six-year drought
(d) use of reclaimed water as an additional supply source
(e) development and maintenance of infrastructure
(f) water quality assurance
(g) potential legislative impacts on water utilities in the future
(h) customer service and the "Core Outcome" of water resources.

The Water Resources Sub-Element is one of seven sub-elements that comprise the Environmental Management Element of the City's General Plan. The other sub-elements of the Environmental Management Element include:

- Surface Runoff
- Sanitary Sewer
- Solid Waste
- Energy
- Noise
- Air Quality

The Surface Runoff Sub-Element addresses the discharge of pollutants to creeks in South San Francisco Bay and the measures necessary to prevent flooding. The Sanitary Sewer System Sub-Element deals with the transportation and treatment of sewage and industrial waste. The Solid Waste Sub-Element provides guidelines for the source reduction, collection, recycling, and disposal of solid wastes. The Energy Sub-Element discusses energy conservation and management. The Noise Sub-Element protects residents from excessive noise that can cause physical and mental health problems. The Air Quality Sub-Element focuses on reducing air pollutant emissions from existing sources in Sunnyvale, as well as developing a policy framework to lessen the emissions associated with future development.

Information in this Water Resources Sub-Element Update is taken from the original Water Resources Sub-Element, various reports to Council (especially during the 1987-1992 drought), information provided from our water suppliers (Santa Clara Valley Water District and San Francisco Water Department), various publications and newsletters produced by the American Water Works Association, the State Department of Water Resources, the California Municipal Utilities Association, and others.

Community Conditions

Key community conditions related to water resources are:

- Sources of Supply and Water Supply System
- Water Demand and Demand Management
- Water Quality Management
- Financial and Economic Aspects of Water Resources Management
- Future Water Resources Management
- Customer Service and the "Core Outcome" of Water Resources

Sources of Water Supply and Water Supply System

Sources of Water Supply. Sunnyvale has four sources of water supply: local groundwater wells, imported supplies from the San Francisco Water Department (SFWD), imported supplies from the Santa Clara Valley Water District (SCVWD), and reclaimed water. The first three sources supply approximately 10%, 50%, and 40% of the water used in the City, respectively. These three water sources meet all federal and state drinking water quality standards. The fourth source of water comes directly from the City's Water Pollution Plant, which generates non-potable reclaimed water primarily for irrigation purposes.

The amount of water that can be taken from these wholesalers depends on contract parameters and the availability of water. The City's twenty year water production forecast falls within SFWD and SCVWD contract parameters, and is designed to meet the City's consumption needs except in periods of drought or supply reduction of supply stemming from further increase in allocations for environmental concerns.

Wells. The City operates eight municipal wells, which produced 1,132 acre-feet[1] of water in fiscal year 1994-95 and have the capacity to produce over 10,000 acre-feet annually. The wells are used to supplement the imported water supplies in order to meet summer peak demand and emergency events.

SFWD Supply. The City has six connections to the SFWD's pipelines and receives approximately 11,000 acre-feet of Hetch Hetchy (HH) water annually. The HH system originates from reservoirs located in and around Yosemite National Park. The HH reservoir water flows from the Sierras across the Central Valley, where it is blended with water from local reservoirs, then crosses the Hayward Fault and passes through the Irvington Tunnel. The resulting blend of water is approximately 85% from HH and 15% from local reservoirs. The City of Sunnyvale has a water supply contract with the City and County of San Francisco (CCSF) that expires in the year 2009.

SCVWD Supply. The SCVWD obtains its water from two sources: 40% from the State Water Project (SWP), which provides water for municipal and industrial use in urban areas and agricultural interests in the Central Valley; and 60% from the federal Central Valley Project (CVP), which was initially constructed to provide water for agricultural uses. SCVWD water is imported from the Sacramento Delta, blended with local reservoir water, and conveyed through a series of aqueducts to the Rinconada Treatment Plant in San Jose. SCVWD delivers approximately 10,000 acre-feet of treated water a year to the City. The City's supply contract with SCVWD will expire in the year 2051.

Reclaimed Water. The Sunnyvale Water Pollution Control Plant (WPCP) produces 12.5 million gallons per day (mgd) of high quality reclaimed water that can be used as a non-potable water source. The Sunnyvale Water Reclamation Program is constructing facilities to deliver this water throughout the City for non-potable uses to promote conservation and augment the potable water supply. Phase I of the Water Reclamation Program, now complete, serves Lockheed/Martin, Moffett Field Golf Course, and the Sunnyvale Golf Course. Phase II will serve other parks and industrial areas in the north part of the City. Subsequent phases of the reclamation project will evaluate extension of facilities to serve western and southern portions of Sunnyvale and extensions into Cupertino and Los Altos. The ability to utilize up to 100% (12.5 mgd) of the output of the WPCP will depend on available opportunities outside the City limits.

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[1] Acre-feet (AF), hundred cubic feet (CCF), and million gallons/day (MGD) are the most commonly used units of measure for water production. To compare these measures, the following formulas are provided:

Gallons/AF = 325,850
Gallons/CF = 7.48
Gallons/CCF = 748

Water Supply System. The City of Sunnyvale owns, operates, and maintains a water supply and distribution system worth in excess of $200 million at current market values. The water system is a closed network consisting of three pressure zones. There are ten storage reservoirs at five locations in the City with a total capacity of 27.5 million gallons, which could provide approximately one day's average need. A 1995 hydraulic analysis of the City's water system, by Metcalf & Eddy, Inc., indicated that the existing storage facilities are adequate for both current and future needs through the year 2005, except for prolonged interruptions due to earthquake or other disasters. The findings indicated that the City's Zone 1 wells could be capped or placed on inactive or reserve status, and two of the six San Francisco Water Department connections could also be placed on reserve status without affecting operating pressures in the distribution system.

The City's service ability under emergency conditions (when a water source is interrupted) was also evaluated during high consumption periods. Without the wells, service could be provided to all of the City's customers with adequate pressures. Without two of the six SFWD connections, service could be provided without appreciable pressure differences in Zone I. If all six of the SFWD connections were lost, minimum pressures could be maintained. The proposed Wolfe-Homestead transmission main will be required to maintain near normal service in Zones I and II. Without the SCVWD connections, Zone III can be supplied by the Wright Avenue plant pumps.

The distribution network consists of transmission and distribution mains totalling approximately 280 miles in length, with pipe diameters varying from 4 to 30 inches. Some 10,000 gate valves provide the means to control and isolate sections of water mains during emergencies.

Within the City's service areas, there are pocketed areas that receive water from California Water Service Company (Cal Water). Should the opportunity arise, taking over these service areas from Cal Water could be cost effective for the City.

Water Demand and Demand Management

If the City is built out according to the Land-Use Sub-Element, water demand is estimated to be 23 mgd, which is 23% greater than current water consumption. The buildout assessment presupposes that all available land in the City will be developed to the maximum extent allowed by current zoning, including new buildings on vacant land and some redevelopment of existing developed land.

The City reduced water consumption between 1984 and 1993, despite an increase in the City's population of approximately 10%. This reduction is attributed primarily to water conservation in the residential, commercial, and industrial sectors as well as changes in the City's industrial mix.

The City of Sunnyvale adopted water conservation plans in 1989 that required implementation of demand management, including strengthening the inverted rate structure, mandatory water

conservation, and implementing best management practices. A 23-29% reduction in water use was achieved, and conservation goals were met. Water usage restrictions have been established for various levels of drought management including 25%, 35%, and 45% reduction.

Water Quality Management

The Safe Drinking Water Act (SDWA) specifies primary regulations that are health-based and enforceable: maximum contaminant levels (MCLs) of contaminants and/or treatment requirements; and secondary regulations that are nonenforceable federal guidelines for the aesthetic quality of drinking water and include water qualities such as taste, odor, color, corrosivity, and hardness for which maximum contaminant level goals (MCLGs) are specified. The federal Environmental Protection Agency (EPA) is authorized to enforce the SDWA, although the State of California has assumed the primacy of enforcing many of the rules and regulations developed under the SDWA.

These rules and regulations, their impact on the City's water system and sources of supply, and the City's compliance status are discussed in detail in other sections of the sub-element. These rules include:

- Surface Water Treatment Rule (SWTR)
- Total Coliform Rule (TCR)
- Lead and Copper Rule (LCR)
- Phase II and Phase V
- Information Collection Rule (ICR)
- Disinfectants-Disinfection By-Products (D-DBP) Rule
- Enhanced Surface Water Treatment Rule (ESWTR)

The City has instituted a thorough and comprehensive water quality monitoring program that covers the City-owned and private wells and water purchased from SFWD and SCVWD to ensure that the City meets all regulatory requirements. The City is in compliance with these requirements and no MCLs or MCLGs have been exceeded.

SFWD water and SCVWD water originate from different sources and are subject to different water quality concerns. Both agencies have vigorous water quality monitoring and protection programs. The main concern regarding the Hetch Hetchy (HH) supply is the adequacy of the disinfection process against microbial organisms such as *Giardia* and *Cryptosporidium*. *Cryptosporidium* is known to affect the immuno-suppressed community. The main concern of the SCVWD's Delta water is the organics and bromides originating from agricultural return flow. These contaminants react with chlorine used for disinfection and produce potentially carcinogenic by-products. Control of these organics and the disinfection process has been a priority focus of the SCVWD.

For customers to experience varying water quality throughout the year is not uncommon since there are three different water sources in Sunnyvale's system. These waters blend within the

distribution system depending on the daily demand, seasonal fluctuations, and disruptions due to maintenance activities; this results in water quality variances. In all cases, Sunnyvale's water quality either meets or exceeds federal and state requirements.

Chemical contaminants in shallow aquifers throughout the industrial and commercial sections of Santa Clara County have caused concerns that these contaminants may eventually affect abandoned agricultural wells and go into the deeper drinking water aquifers. The SCVWD has implemented a program to locate and seal these wells The SCVWD estimates the program will cost several million dollars in the next few years, and funding has been provided. In all cases, water quality would meet all federal and state requirements.

Because of the proximity of some of the City-owned wells to known underground contamination or industrial areas, monitoring for organic chemicals in the wells is performed on a monthly basis. The City has the ability to shut down any well without affecting the system's overall ability to deliver water for drinking and emergency purposes.

Financial and Economical Aspects of Water Resources Management

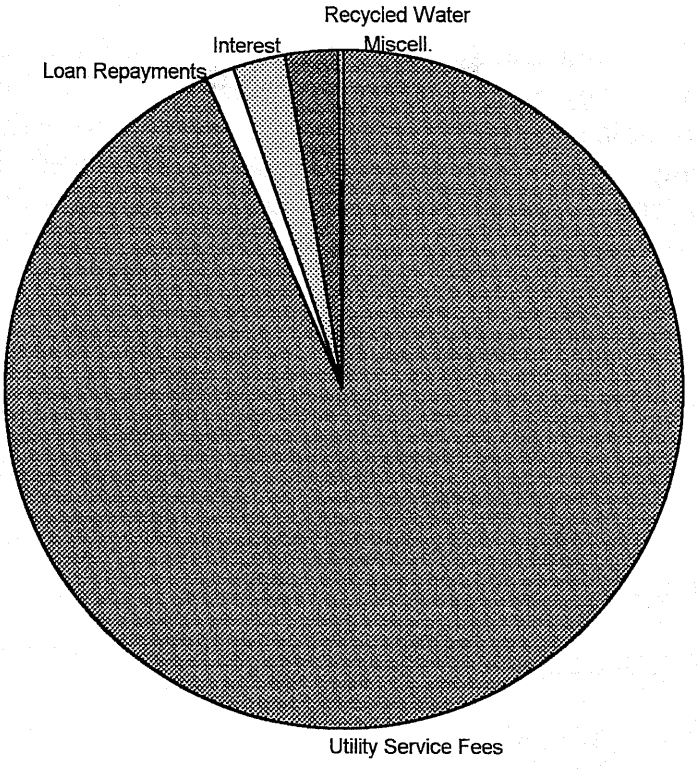
The Water Utility Fund. The Water Fund is one of three utility funds, including the Sewer Fund and the Refuse Fund, that make up the City's combined Utility Fund. The combined utility fund is used to balance capital expenditures and reserves at a more stable level to assist in the stabilization of rates over time. The Water Fund includes a 25% operating contingency as well as a 25% capital reserve. The capital reserve is used to fund needed infrastructure replacement projects for the water utility. The City is in the process of developing a comprehensive infrastructure management plan that will document the life expectancy and replacement costs for all portions of the water utility system as well as all other City-owned and operated facilities. This plan will develop life schedules likely to be in the 50-100 year range that will allow for a comprehensive funding of replacement of infrastructure over a long period of time. The schedule that will be developed for the infrastructure management plan will be reviewed annually and any changes to the type of equipment or the schedule for replacement will be approved in advance by the City.

Sunnyvale bases its utility rates on the actual cost of providing service to customers. Utility rates for some other cities are not based on cost of service and some categories of customers may subsidize other categories.

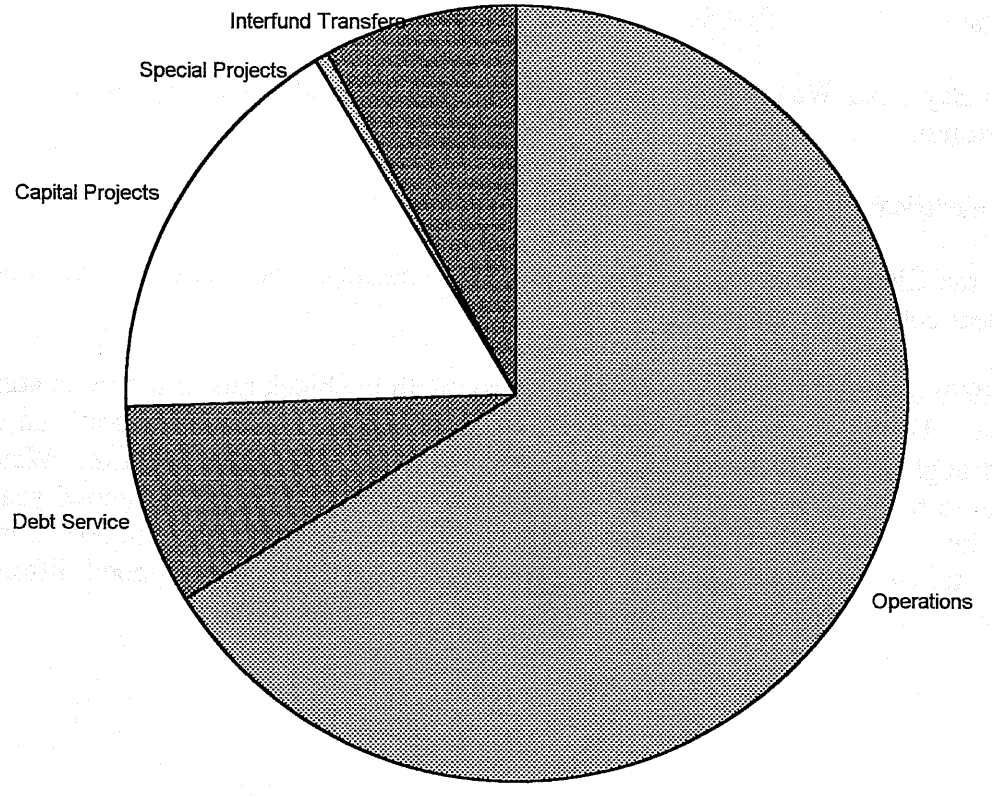
The cost of service methodology is used consistently throughout the utility funds within the City. This method encourages residents and businesses to use our utility services in the most efficient way.

The graphs on the following page illustrate budgeted 1996-97 Water Fund expenses and revenues.

1996/97 Budgeted Water Fund Revenues



1996/97 Budgeted Water Fund Expenses



Water Resources and Economic Development. Water is a critical raw resource needed in a variety of industries in the valley, ranging from the fabrication of silicon chips to various food processing uses. As growth in population continues, businesses are becoming more sensitive to issues of water availability and quality, garbage and sewer rates and other development related fees when deciding on a location for their operations. Many companies have enacted their own water conservation and recycling programs due to the high cost of water as a percentage of their expenditures.

Having a reliable and adequate source of water is a primary concern for the residents and businesses of Sunnyvale. The City's reclaimed water program will eventually offer an alternative source of water to prospective businesses, one that will not be dependent upon external circumstances and can be used for a variety of industrial and agricultural purposes.

Water Rates. Water rates are established annually by the City Council. A comparison of water rates in Sunnyvale and neighboring cities in 1995 is as follows:

City	Average Residential Bill Per Month *
Palo Alto [1]	$27.74
Los Altos	$42.00
San Jose	$24.76
Mountain View	$24.78
Sunnyvale	$16.06
Santa Clara [1]	$16.05
Milpitas	$18.69

* Based on Bay Area Water Users Association Survey of 1995. Assumes usage of 11,220 gallons per month.

[1] Purchases electrical power from its own utility.

Periodically, the City reviews the methodology used to calculate the water rates to ensure that the rates reflect actual cost.

Prior to the 1976 drought, the City used a traditional declining block rate structure to administer its water rates. Under this scenario, the more water used, the less cost per unit. In the first year of the drought, this rate structure was changed to a flat block rate structure. Water rates were changed to be a flat amount per unit, regardless of usage. During the second year of the drought, an inverted rate structure was imposed in order to encourage conservation. The inverted rate strategy incorporated only three pricing blocks which were applied differently to different user groups. The three pricing blocks were defined as follows:

Lifeline Category. This rate block includes the first 600 cubic feet of water used each month. Forty percent (40%) of residential use falls within this block. For many other small users this rate block encompasses basic everyday use.

Conservation Category. The conservation block was intended to represent a cross-section of users where significant conservation should and must occur in time of limited water supply or drought.

High Use/High Impact Category. This rate block category connotes an essential and dramatic need for reduction when levels of use reduction higher than 30% are to be achieved.

Since the drought, the City has continued to use an inverted rate structure in order to encourage conservation practices developed during the drought. Water rates are grouped into lifeline and conservation categories under seven different rate blocks. For a more detailed description of the water rate structure, please see Appendix A.

Future Water Resources Management

Factors Impacting Future Water Resources Management. Recent developments impacting water resource management include:

1. Sunol Filtration Plant Violations
2. Raker Act Amendment
3. Tuolumne River Restoration Agreement
4. Central Valley Project Improvement Act
5. Bay/Delta Accord
6. Monterey Agreement

1. Sunol Filtration Plant Violations. SFWD's Hetch Hetchy water supply has obtained filtration avoidance from the State Department of Health Services (DHS), providing that all California Code of Regulations Title 22 requirements are met. In March 1995 during extreme storm periods, the Sunol Filtration Plant filtered water effluent failed to meet the Title 22 turbidity requirements. The SFWD is undertaking corrective measures to ensure future compliance and maintenance of the Filtration Avoidance status. If DHS mandates filtration, the suburban customers' share of the cost could be in the range of $0.11 to $5.57 per hundred cubic foot (CCF). The current City rate for water per CCF is $0.58.

2. Raker Act Amendment. SFWD has been paying an annual fee of $30,000 for use of the HH Park lands. A bill was passed by Congress in 1995 to increase the fee to $570,000 per year. The impact to suburban customers' rates will be approximately $0.002 per hundred cubic foot.

3. Tuolumne River Restoration Agreement. The Federal Energy Regulatory Commission (FERC) is considering approval of an agreement between the City of San Francisco and the Modesto and Turlock Irrigation Districts which would triple water release from the new Don Pedro Dam during months of critical importance to salmon spawning, incubation and migration. These releases are being proposed to restore salmon habitats and increase salmon population along the lower Tuolumne River. The current level of seasonal discharge of 94,000 acre-feet is expected to increase to 300,000 acre-feet. The salmon population along the Tuolumne has dramatically decreased in recent years, from about 100,000 in the 1980s to 1,200 in 1995. Under the agreement, the City of San Francisco would pay $3.5 million per year to the Modesto and Turlock Irrigation District to flush river flatland flows and reduce pollution levels. An additional $1.2 million will be paid for riverside improvements, recreational facilities and a biologist monitor. The estimated impact to Sunnyvale residents is $0.034 per hundred cubic feet.

4. Central Valley Project Improvement Act (CVPIA). The CVPIA set aside 800,000 acre-feet a year for fish and wildlife purposes and consequently decreased the availability of CVP water to its contractors, including SCVWD. The existing Act provides financial incentive for contractors to renew their contract in the next two to three years for a term of 25 years without a renewing provision. The SCVWD may opt to renew its contract and seek a guaranteed renewal every 25 years. There are pending bills in the House to amend the CVPIA. The amendments include area relief bills for agricultural interests and are not supported by SCVWD. However, the bills potentially increase CVP supply reliability by providing a minimum 75% guarantee to CVP contractors' entitlements.

5. Bay/Delta Accord. The California Water Plan predicts that by the year 2020, a potential shortfall of 2 to 4 million acre-feet will occur in average years, and 3 to 5 million acre-feet during drought years. Urban water demand, which represents 11% of statewide water demand, is projected to grow by 50% from the current 32 million acre-feet to 49 million acre-feet in the year 2020, despite extensive water and environmental conservation. Sunnyvale's population is projected to grow by approximately 22% from 1995 to 2015, according to the Association of Bay Area Governments (ABAG).

   A stakeholder group consisting of the seven major urban water users, agricultural users, and environmental/fishing interest groups has been formed to explore long-term Bay/Delta water resources management alternatives and to proceed with the environmental review process. Major issues identified by the group are the need for ecosystem restoration, water reliability, drinking water quality, and planning for natural disasters such as Delta levee failures. The need for an integrated long-term solution that incorporates increased conservation, water recycling, optimizing water resources, and additional water supply facilities with appropriate legal protections and institutional changes has been identified. Coordination with local, state, and federal programs for maintaining water quantity and water quality for fisheries and aquatic habitat is also necessary. The SCVWD is represented and actively involved in the stakeholder group. SB900 (Costa) was a bill introduced recently for issuance of general obligation bonds to fund water programs including potable water and wastewater, flood

control, water recycling, agricultural drainage, non-point source pollution, the state's share of CVPIA funding, a comprehensive Bay/Delta program, fish screening, enhancement of the San Joaquin Valley drainage relief program, and conservation efforts to increase ground water supply. This bill will require voter approval in the November 1996 election.

6. Monterey Agreement. The State Water Contractors recently reached an agreement with the State Department of Water Resources (DWR) to make an additional 130,000 acre-feet of agricultural use water available for purchase by urban contractors. The SCVWD is considering the purchase of 20,000 acre-feet of entitlement. The Monterey Agreement also allows the contractors using State Project and non-state water project facilities to utilize water banking, which increases the operational flexibility of the SWP contractors dramatically. The SCVWD Board of Directors has approved the contract with the DWR to implement the provisions of the Monterey Agreement.

Future Trends in Water Resources Management. The quantity of available imported water to the City may be significantly reduced in the future because of competing interests for freshwater by both SCVWD and SFWD.

Well-water pumping in the City will be more strictly managed by SCVWD, due to the reduction in aquifer storage capacity and the reduction in surface water availability for recharge purposes.

Because SFWD's system currently does not provide adequate storage for customer peaking purposes, the State Department of Health Services may require retail customers of SFWD to provide adequate storage for its own peaking operation. Also, DHS suggests that suburban customers should have a seven day storage capacity to provide for periods of emergency, such as a major earthquake. The City currently has a one day storage capacity. If DHS mandates a seven day storage capacity, regional storage sites will need to be developed.

Therefore, innovative demand side management programs will have to carry the load into the future in balancing supply vs. demand. Techniques such as water banking, water transfers, conjunctive use, water reclamation, plumbing retrofits, Xeriscaping, water rate structures that encourage conservation, and other demand side management options may have to be put into place.

New management practices will also need to be developed in order to address infrastructure management issues. The age of the existing water distribution system ranges from 30 to 50 years. The physical condition of water facilities in older areas of the City will begin to deteriorate, requiring additional maintenance, upgrading, and replacement.

Customer Service and the "Core Outcome" of Water Resources

Although the strategies outlined in the Water Resources Sub-Element are expected to be long term in nature, in order to enhance the ability to serve customers, new programs and services

are being developed and existing programs in water resources may need to be restructured. These programs will essentially become the organizational tools necessary to achieve the long-term goals of the City.

The proposed service outcomes or missions will be understandable mission statements which define service delivery. They will be used to clearly communicate to the Council, Boards, Commissions, community, and staff, the effectiveness and efficiency of the services the City provides. The new system, like the current one, will maintain a strict level of accountability, yet will allow for flexibility. The communications program will involve:

1. Communications with Our Customers
2. Customer Satisfaction Surveys
3. Customer Verification Surveys

Proposed community condition indicators are presented in the table shown on the following pages.

TABLE 4.
ENVIRONMENTAL MANAGEMENT
Community Condition Indicators

		Actual 1992-93	Actual 1993-94	Actual 1994-95	Projected 1995-96
3.1	Millions of gallons of water sold annually:				
	A. Residential	3,992	4,526	4,201	4,500
	B. Other	2,872	3,257	2,839	3,050
3.2	Average daily water demand in million gallons	18.8	21.3	20.6	20.7
3.3	Miles of City water mains and appurtenances	282	282	282	282
3.4	Water use peak/minimum day in million gallons	38/13	39/13	42/11	40/10
3.5	Cost to delivery water ($/100 cubic-feet)	1.08	.88	.94	.96
3.6	Unit cost for well water ($/acre-foot)	347	315	331	330
3.7	Unit cost for SCVWD water ($/acre-foot)	335	316	312	315
3.8	Unit cost for SFWD water ($/acre-foot)	438	288	335	320
3.9	Annual consumption per acre (acre-foot/acre)	1.3	1.5	1.4	1.4
3.10	Water services	27,631	27,700	27,925	27,950
3.11	Fire hydrants	3,273	3,280	3,280	3,288
3.12	Storage capacity (million gallons)	28	28	27.5	27.5

ENVIRONMENTAL MANAGEMENT
Community Condition Indicators

		Actual 1992-93	Actual 1993-94	Actual 1994-95	Projected 1995-96
3.13	Wells/production capacity (gallons/minute)	11/8,400	11/8,400	9/6,500	9/6,500
3.14	Energy cost for water produced ($/acre-foot)	17	16	14	14
3.15	Number of samples collected for testing	6,182	6,789	6,821	6,700
3.16	Curb miles of streets that require sweeping	660	660	660	665
3.17	Miles of storm water lines	139	139	139	140
3.18	Drop inlets in storm drainage system	3,280	3,290	3,290	3,528
3.19	Miles of sanitary sewer mains	285	285	285	290
3.20	Millions of gallons of liquid wastes treated per year	4,666	4,840	5,584	4,900
3.21	Average daily volume of liquid wastes in millions of gallons	12.8	13.3	13.5	13.5
3.22	Average dry weather (May-October inclusive) liquid waste flow per day as a percentage of treatment plant design capacity	43.4%	45.1%	45.5%	45.5%
3.23	Redevelopments and utility additions which require map updates	19	20	18	19
3.24	Subdivision construction permit applications	7	10	7	7
3.25	Development permit applications	4	3	2	3

ENVIRONMENTAL MANAGEMENT
Community Condition Indicators

		Actual 1992-93	Actual 1993-94	Actual 1994-95	Projected 1995-96
3.26	New developments requiring map changes	11	13	13	12
3.27	Street cut permit applications	230	235	155	160
3.28	Air pollution: Days ozone standards exceeded per year	2	2	6	7

Goals and Policies

Based on the findings and issues summarized above and discussed in more detail in the body of the Sub-Element, the following Goals and Policies for the management of water resources are proposed:

Goal 3.1A **Manage future demands to ensure that existing and realistically certain future water supplies will be adequate.**

Policy 3.1A.1 Contract for water supplies based on projected reasonable demands.

Policy 3.1A.2 Purchase potable water utilizing the most cost-effective sources(s), subject to contractual requirements with our suppliers.

Policy 3.1A.3 Maintain a cost-effective preventative maintenance program that provides for sufficient reliability of all potable and reclaimed water system facilities.

Goal 3.1B **Ensure that potable and reclaimed water meet all quality and health standards.**

Policy 3.1B.1 Ensure that backflow from potentially contaminated water services is prevented through an aggressive inspection and maintenance program.

Policy 3.1B.2 Develop a comprehensive water quality monitoring program that meets or exceeds all state and federal requirements, while also meeting specific needs of the City and our citizens.

Policy 3.1B.3 Develop an action plan to respond to and protect from contamination of water supplies.

Goal 3.1C **During emergency conditions, ensure that the water distribution system can meet minimum fire suppression and quality standards.**

Policy 3.1C.1 Maintain an emergency water operations plan.

Policy 3.1C.2 Provide sufficient storage and backup power to meet minimum requirements for water during emergencies.

Goal 3.1D **Manage potable water demand through the effective use of water rates, conservation programs and reclaimed water.**

Policy 3.1D.1 Provide for an on-going potable water conservation program.

Policy 3.1D.2 Provide for potable water conservation programs that will effectively respond to periods of water shortages/droughts.

Policy 3.1D.3 Expand opportunities for reclaimed water use consistent with ecology needs of the Bay and/or diminished potable water supplies.

Goal 3.1E **Maintain a financially stable water fund through a user-based fee system that funds operation, capital improvements, infrastructure replacement and public education programs.**

Policy 3.1E.1 Establish potable and reclaimed water rate structure that will ensure funding of capital improvements, operational and maintenance needs, and the development of an adequate infrastructure replacement reserve.

Policy 3.1E.2 Establish rate structures that encourage on-going potable water conservation and that can be modified to achieve even greater levels of water conservation during period of water shortages/droughts.

Policy 3.1E.3 Establish and maintain adequate reserve levels to replace or renovate Water Fund infrastructure components in order to maximize asset life and meet future community needs.

Goal 3.1F **Provide a customer service program that emphasizes customer satisfaction and confidence.**

Policy 3.1F.1 Maintain the provision of a high quality, dependable source of both potable and reclaimed water at a reasonable and competitive cost to the consumer.

Policy 3.1F.2 Inform customers on issues relating to water supply, quality, rates, conservation, and other matters.

Policy 3.1F.3 Solicit customer input through consumer surveys, City-wide events, and other forums.

Policy 3.1F.4 Monitor customer satisfaction through periodic surveys and responses to citizen inquiries.

Policy 3.1F.5 Train and encourage employees to develop a customer service work ethic.

Goal 3.1G **Support legislation and other efforts that promote the accomplishment of the City's Water Resources Sub-Element Goals and Policies.**

Policy 3.1G.1 Support efforts by both the federal and state governments to work cooperatively with municipal governments to ensure safe drinking water.

Policy 3.1G.2 Seek support for federal and state funding of Sunnyvale's water resources projects and programs.

Policy 3.1G.3 Oppose efforts to unreasonably reduce the availability of water supply to Sunnyvale.

Policy 3.1G.4 Support efforts to encourage reasonable demand side water conservation programs.

Policy 3.1G.5 Support legislation that would allow greater flexibility for water transfers, subject to protection of water rights and any adverse impacts on affected communities.

Policy 3.1G.6 Support legislation and regulations that establish beneficial water quality standards that are based on scientific facts, benefit-rick analyses, and other supportable evidence.

COMMUNITY CONDITIONS

The community conditions related to water resources for the City of Sunnyvale include the following subject areas:

- History of the City's Water System
- Sources of Supply and Water Supply System
- Water Demand and Demand Management
- Water Quality Management
- Financial and Economic Aspects of Water Resources Management
- Factors Impacting Future Water Resources Management
- Customer Service and the "Core Outcome" of Water Resources

History of the City's Water System

At the time of the City's incorporation in 1912, Sunnyvale's population was approximately 1,500 and the municipal water utility was completely dependent on groundwater well for its potable water supply. The original water supply source was a privately owned well at the Joshua Hendy Iron Works. Several years later, the Taaffe Street Plant was constructed. By 1926, three wells were in operation at this location. These wells are no longer in use. During World War II, the war contracts awarded to the Joshua Hendy Iron Works led to the development of the Central Water Plant and Well.

After World War II, the City grew very quickly. By the early 1950s, demand for water grew to the point where the aquifers were being overpumped. During that period, subsidence in the northern areas of the City was in excess of 0.3 feet per year. By 1952, the population of the City had risen to about 10,000, and the City entered into a contract with the City of San Francisco's Water Department (SFWD) for imported water from the Hetch Hetchy system. That same year, three connections were made to the San Francisco aqueducts and were supplemented by eight City-owned well sites. By 1969, the City's population had reached 96,000 and the City contracted with the Santa Clara Valley Water District (SCVWD) for two connections to their West Pipeline. By 1970, the City had developed all three of its current water supply sources (SFWD/Hetch Hetchy, SCVWD imported water, and City-owned municipal wells).

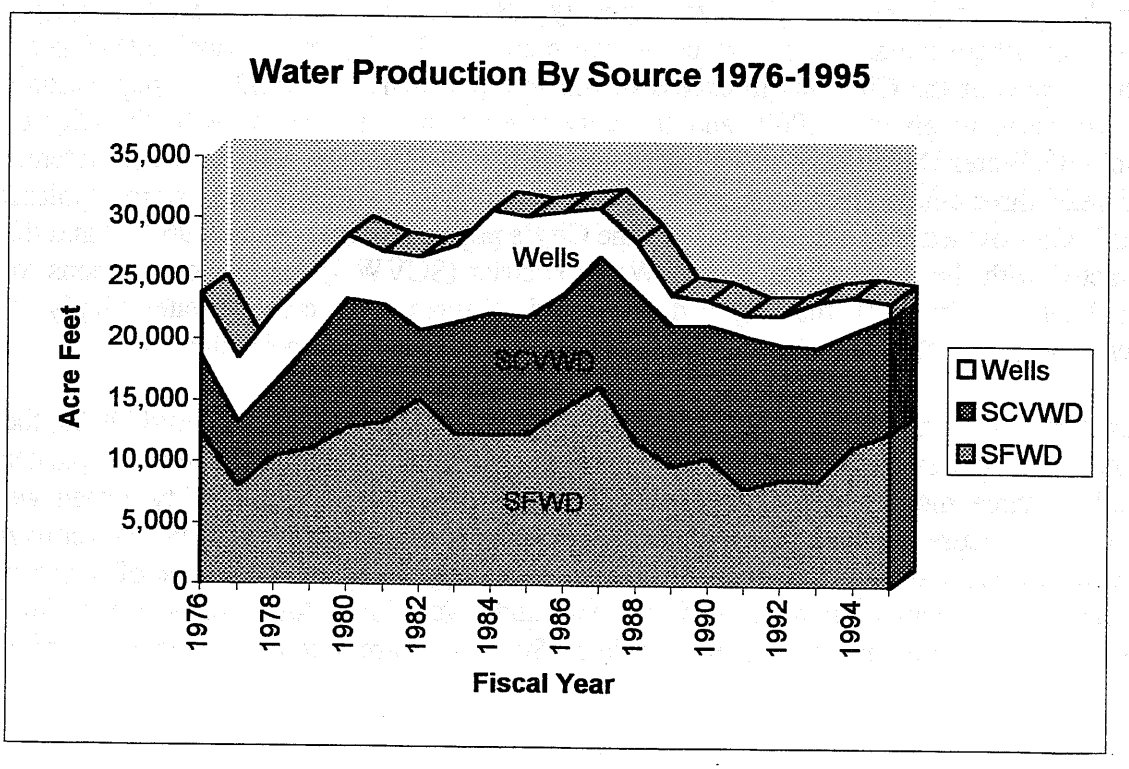
As the demand for water continued to increase during the 1970s and into the mid 1980s, the City expanded its connections to the SFWD/Hetch Hetchy system to a current total of six connections and added three more water supply wells, bringing the total number of City-owned wells to eleven. To ensure water supplies during periods of emergencies, the City also constructed interconnects with surrounding water utilities. Currently there are a number of interconnects with the cities of Santa Clara, Mountain View, and Cupertino. Also, many of the California Water Service Company service areas within Sunnyvale are interconnected with the City's system.

The community's water demand reached a peak in 1987, when it was anticipated that the demand for water would continue to grow, reaching a peak of 36,000 acre-feet per year at "build-out." The prolonged six-year drought of the late 1980s and early 1990s, combined with fundamental changes in the nature of the City's industrial community, has dramatically changed and reduced demand for water now and into the foreseeable future. Based on the fundamental changes in conservation ethics of consumers, combined with the industrial community converting manufacturing to new types of low-water usage industries, the current projection for the ultimate demand for water at build-out has been reduced to 28,000 acre feet per year.

Sources of Supply and Water Supply System

Sunnyvale's sources of water supply include local groundwater wells and imported supplies from San Francisco Water Department (SFWD) and the Santa Clara Valley Water District (SCVWD). For additional local water supplies during emergencies, the City has the capability to easily connect with the cities of Santa Clara, Mountain View, and Cupertino, and with many of the California Water Service Company service areas within Sunnyvale.

Of the water used in the City, The SFWD supplies approximately 50% and the SCVWD supplies approximately 40%. The remaining 10% is produced from 8 City-owned and operated wells, located in various areas throughout the City. Water withdrawn from wells requires a pump tax to the SCVWD making the price of well water similar to SCVWD wholesale water. Historical water production of these sources is shown in the following illustration:



The City now has a fourth source of water: reclaimed water from the Sunnyvale Water Pollution Control Plant (WPCP). The plant produces 12.5 million gallons per day (mgd) of high quality tertiary effluent that can be used as a non-potable water source. The Sunnyvale Water Reclamation Program, initiated in 1991, is in the process of constructing facilities to deliver this water throughout the City for non-potable uses to promote conservation and augment the potable water supply. The primary use of reclaimed water is for landscape irrigation. Other potential uses are for construction, cooling towers, and industrial processes.

The amount of water that can be taken from the City's wholesalers depends on contract parameters and the availability of water. The twenty-year water forecast, which estimates the City's consumption requirements in future years, falls within the City's contract parameters, except for periods of drought and periods when the supply is reduced due to increases in allocations for environmental concerns.

A twenty-year water forecast is prepared annually. Water demand from various supply sources is also estimated. Table 1 presents the latest production forecast. Future pricing for each of the potable sources, projected reclaimed water deliveries, and the future cost of power for the wells are also estimated annually. The twenty-year water forecast is graphically depicted as follows:

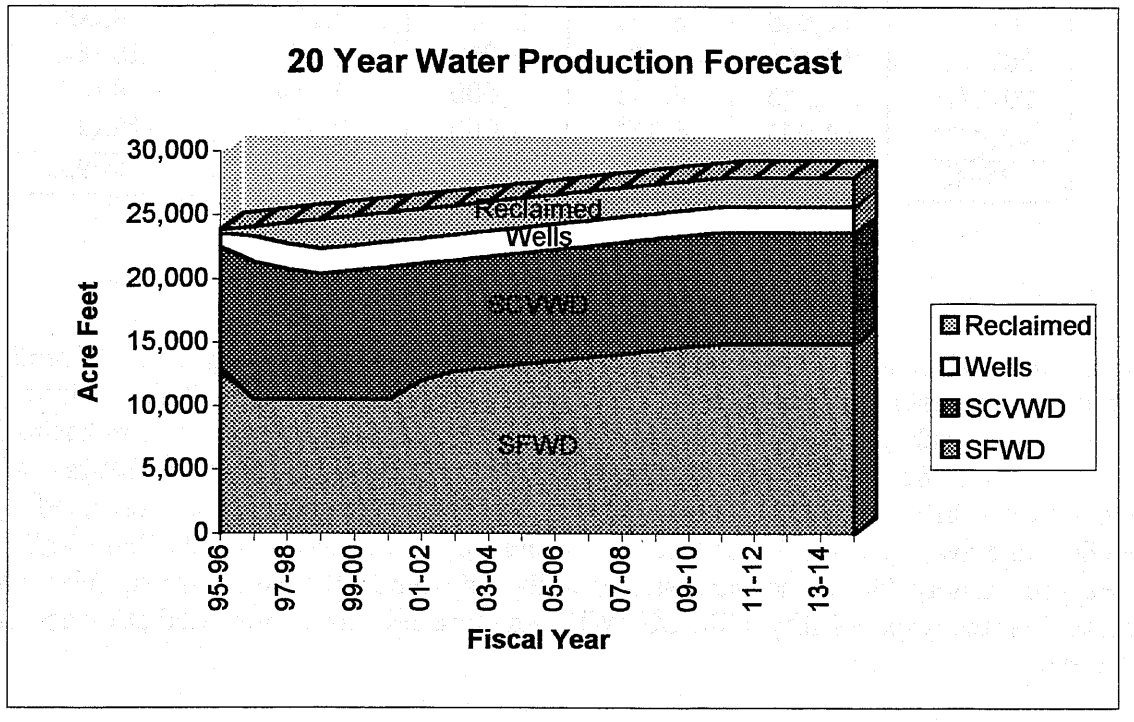


Table 1. 20-Year Water Production Forecast.

Projected Water Production, acre-feet					
Year	SFWD	SCVWD	Wells	Reclaimed	Yearly Totals
1995/96	12,801	9,693	1,070	280	23,844
1996/97	10,503	10,836	2,000	784	24,123
1997/98	10,500	10,290	2,000	1,612	24,402
1998/99	10,500	9,897	2,000	2,284	24,681
1999/2000	10,500	10,176	2,000	2,284	24,960
2000/01	10,500	10,455	2,000	2,284	25,239
2001/02	12,001	9,233	2,000	2,284	25,518
2002/03	12,742	8,771	2,000	2,284	25,797
2003/04	13,021	8,771	2,000	2,284	26,076
2004/05	13,300	8,771	2,000	2,284	26,355
2005/06	13,579	8,771	2,000	2,284	26,634
2006/07	13,858	8,771	2,000	2,284	26,913
2007/08	14,137	8,771	2,000	2,284	27,192
2008/09	14,416	8,771	2,000	2,284	27,471
2009/10	14,695	8,771	2,000	2,284	27,750
2010/11	14,945	8,771	2,000	2,284	28,000
2011/12	14,945	8,771	2,000	2,284	28,000
2012/13	14,495	8,771	2,000	2,284	28,000
2013/14	14,945	8,771	2,000	2,284	28,000
2014/15	14,945	8,771	2,000	2,284	28,000
Total	261,778	184,603	39,070	41,504	526,955

Santa Clara Valley is situated on an alluvial plain consisting of alternating layers of sand, gravel, and clay, extending in some areas to a depth of more than 1,000 feet. This geology provides for a massive underground water basin. There are three major groundwater sub-basins in Santa Clara County: the Santa Clara sub-basin, the Coyote sub-basin, and the Llagas sub-basin. Groundwater in Santa Clara County is tapped through wells owned and operated by water retailers or private parties. In the Santa Clara and Coyote sub-basins (Santa Clara Valley), there are approximately 258 public water supply wells and over 1,200 private wells. Management of this basin is the responsibility of the SCVWD, which issues permits for installation and operation of wells.

Some water percolates naturally through the ground along the perimeter of the valley in an area known as the recharge zone. The valley floor itself, because of the numerous impervious clay layers, allows minimal recharge. To enhance the recharge of water into the groundwater basin,

the Santa Clara Valley Water District operates a series of reservoirs and percolation ponds around the perimeter of the Santa Clara Valley. Eight storage reservoirs have been constructed to collect 155,000 acre-feet of stream flows and are the major source of groundwater recharge.

The SCVWD also owns and operates two reservoirs, Uvas and Chesbro, which recharge a separate groundwater basin in the southern portion of the County.

When groundwater basins are depleted, water levels drop and land subsidence occurs, as unconsolidated clay layers are compacted. This irreversible process has been observed in some areas where the ground level has sunk more than 13 feet since 1900 and has caused serious settling problems for flood drainage, sewage collection, and other major infrastructure systems. The SCVWD, in cooperation with major water retailers, has developed a Groundwater Management Plan. During the recent six-year drought, the SCVWD and the water retailers were able to raise water levels in the groundwater basin despite the severe water shortage throughout the State. Groundwater levels in 1995 are at historically high levels. The SCVWD intends to maintain groundwater levels above the subsidence level at all times. To conserve groundwater resources, the SCVWD adopted pricing structures with the cost for groundwater higher than the imported water supplies.

Wells

The City currently operates eight principal wells located in various areas throughout the City. These wells all draw water from deep aquifers. The wells produced approximately 1,132 acre-feet of groundwater in fiscal year 1994-95, but have the ability to produce over 10,000 acre-feet annually. The wells are primarily used as supplemental supplies to imported water to meet the summer peak demand and for emergency situations, such as fires or loss of an imported supply source.

City well-water meets all state and federal water quality standards, and the water has shown no signs of contamination from industrial sources.

SFWD Supply

In 1952 the City entered into a contract with the City and County of San Francisco (CCSF) for water from the Hetch Hetchy (HH) system. The HH system originates from reservoirs located in and around Yosemite National Park. The HH reservoir water flows from the Sierras across the Central Valley, where it is blended with water from local reservoirs, crosses the Hayward Fault and passes through the Irvington Tunnel. The resulting blend of water is approximately 85% from HH and 15% from local reservoirs. From the Irvington Tunnel, San Francisco Bay Division No. 1 and No. 2 pipelines cross the San Francisco Bay and the No. 3 and No. 4 pipelines pass around the south end of San Francisco Bay. Currently, Sunnyvale has six connections to the Bay Division No. 3 and No. 4 pipelines along Highway 101 and acquires approximately 11,000 acre-feet of water annually.

The City has an individual water supply contract with the City and County of San Francisco as well as being a co-signer to a master contract with CCSF. The individual water supply contract went into effect on August 8, 1984, with a term of 25 years. This term coincides with the master agreement, and both documents expire in the year 2009.

Maximum and minimum usage of water is stipulated in the individual contract with CCSF. When the overall usage by all suburban retail customers exceeds the maximum available level, the maximum amount of water available to Sunnyvale would be reduced from 16,800 acre-feet per year under the individual contract to 14,090 acre-feet per year under the master agreement.

During drought or other circumstances, where contractual demands of all of SFWD's customers cannot be met, this allocation could be lowered. San Francisco could declare a state of emergency, enact an ordinance to stipulate water rationing on individual suppliers, and impose penalties if emergency allocations were exceeded.

During the 1987-1992 drought, SFWD instituted a water banking and penalty system for its suburban customers. Sunnyvale's usage was within its allocation and the City built up a considerable amount of water in SFWD's water "bank," while some other customers paid significant penalties. San Francisco rescinded its emergency ordinance and eliminated all water banking at the end of the drought.

SCVWD Supply

In 1969, the City contracted with the SCVWD for its imported water supply via two connections to SCVWD's West Pipeline. SCVWD water is imported from the Sacramento Delta, blended with local reservoir water, and conveyed through a series of aqueducts to the Rinconada Treatment Plant in San Jose. Treated and disinfected water is distributed to customers throughout the western portion of Santa Clara Valley. The SCVWD delivers approximately 10,000 acre-feet of water a year to the City.

The SCVWD obtains its water from two sources: 40% from the State Water Project (SWP), which provides water for municipal and industrial use in urban areas and agricultural interests in the Central Valley; and 60% from the federal Central Valley Project (CVP), which was constructed initially to provide water for agricultural uses.

Construction of the SWP started in the early 1960s and continues today. Major features include Oroville Dam on the Feather River, the Harvey O. Banks Delta Pumping Plant, and the California Aqueduct. Remaining project elements include the Auburn Dam, which has been reviewed again recently in Congress, and the Delta Diversion Facility, which may not be constructed because of fish and wildlife concerns. The SCVWD obtains 100,000 acre-feet of water annually from the SWP via the South Bay Aqueduct (SBA).

The 400-mile-long Central Valley is bordered on the east by the Cascade and Sierra Nevada mountain ranges and on the west by the coastal ranges. The northern third of the valley is drained southerly by the Sacramento River, the state's largest river, yielding about 35% of the

total outflow of all rivers in the state. Most of the southern two-thirds of the valley, a much drier region, is drained northerly by the San Joaquin River and its tributaries. The two rivers converge in a maze of channels and islands known as the Sacramento/San Joaquin Delta, which also receives freshwater inflow from other smaller streams.

During the boom years following the California Gold Rush, many of the state's settlers turned to ranching and dry land farming in the Central Valley. Because of a series of severe droughts in the latter part of the nineteenth century, major redistribution of the state's water occurred to allow farming to continue in the San Joaquin Valley. Although the San Joaquin Valley contains two-thirds of the Central Valley's farmland, it receives only one-third of the precipitation. Farmers have pumped the groundwater extensively for crop irrigation, depleting many of the wells, and forcing farmlands out of production.

In 1933, the California Central Valley Project Act (CVPA) was enacted. In 1935, with the passage of the Federal Rivers and Harbors Act, the federal government assumed control of the CVP.

Many of the CVP's facilities were constructed between 1937 and 1951. By 1990 the project included 20 dams and reservoirs with a capacity of storing 11 million acre-feet of water, 11 power plants, 50 miles of major canals and aqueducts, 3 fish hatcheries, and a system of tunnels, conduits, power transmission grids, and other facilities.

The major feature of the CVP is Shasta Dam, which forms the largest storage reservoir in the state (4.5 million acre-feet). Other features include Friant Dam (Millerton Lake) on the San Joaquin River, San Luis Reservoir, New Melones Dam, and the Delta-Mendota Canal. Most of the water provided by the Central Valley Project is for agricultural use. Some of this water, however, is diverted to municipal and industrial use. The SCVWD has a contract with the Bureau of Reclamation (BuRec) for approximately 150,000 acre-feet of CVP water per year through the recently completed San Felipe Project.

The City contracted with SCVWD to purchase treated surface water on January 27, 1981. The contract has a 70-year term and will expire in the year 2051. The contract requires the City to submit a delivery schedule every three years to the SCVWD. After reviewing its ability to deliver water to the City based on forecasted availability of supply and the total water delivery requested, SCVWD sets a three year delivery schedule and applies a "Take-or-Pay" provision with maximum peak delivery limits.

During periods of drought, SCVWD's water delivery may be curtailed by CVP and/or SWP. The SCVWD may also enact an emergency ordinance requesting usage reduction.

Reclaimed Water

To preserve potable water supplies for the highest use, the California Water Code requires the use of reclaimed water in place of potable water whenever it is economically and technically feasible. Reclaimed water is a reliable source of supply for non-potable uses during a drought, lessening the impact of conservation if high level conservation goals are to be achieved.

Significant water reclamation can also provide an alternative to comply with future discharge requirements instead of constructing advanced wastewater treatment facilities. The City's wastewater treatment plant effluent discharges into the San Francisco Bay, where discharge limits for heavy metals, such as copper, zinc, and chromium, are very stringent. Reclamation of wastewater becomes an effective means of reducing the mass loading of these heavy metals being discharged into the Bay. The cost savings in avoidance of building and operating metal removal processes at the WPCP is a real incentive for achieving a high level of reclamation.

The use of reclaimed water benefits the following groups:

- Sewer ratepayers benefit by the reduced costs of lowering mass emissions to the San Francisco Bay (i.e., avoided costs of additional sewer effluent treatment processes to meet discharge requirements).

- Reclaimed water users benefit by avoiding strict conservation requirements and water use restrictions during droughts and by paying less than they currently pay for potable water.

- Potable water users benefit from the substitution of reclaimed water for potable water, which increases the water supply available for potable uses.

- All Sunnyvale residents benefit from securing a long-term adequate water supply to sustain economic growth and ensure public health.

- All water users benefit from postponing or obviating the need for additional importation of water.

A reliable long-term water supply enhances the City's economic growth. Costly development of new imported water supplies may be avoided.

Currently, the City is considering governing the use of reclaimed water for non-potable uses when this is technically and economically feasible. To properly administer the reclaimed water system, a permit system needs to be established. Reclaimed water accounts should be subject to the same general rules and requirements as the potable water and sewer accounts. These rules and requirements need to be developed and adopted.

Capital costs in excess of $14 million have been budgeted from the Water Sub-Fund for Phase I and II of the Reclamation Program. In addition, state and federal grants are being pursued. Operating costs of the system will be paid by the users.

A resolution adopted in 1993 by the Board of Directors of the SCVWD provides financial incentives for development of water reclamation projects in Santa Clara County. The financial incentive is based on SCVWD's estimate of avoided cost for developing an equivalent amount of potable water supply. Negotiations are underway between SCVWD and Sunnyvale to secure financial contributions from SCVWD for reclaimed water generated.

Water Supply System

Although not obvious, Sunnyvale's elevation varies from sea level at the north end of town to 300 feet above sea level at the southwest corner of town. Because of this elevation difference, the water system has to be broken up into a series of three pressure zones (see Figure 1). Zone I extends roughly from El Camino Real northward to the San Francisco Bay and is supplied mostly by Hetch Hetchy water. Zone II consists of everything south of Zone I except for the southwest corner of the City. This pressure zone is supplied by a mixture of City wells, Hetch Hetchy water, and Santa Clara Valley Water District water. Zone III, the smallest pressure zone in our system, is in the southwest corner of the City, bounded roughly by Hollenbeck Avenue on the east and Fremont Avenue on the north. This pressure zone is served by a combination of Santa Clara Valley Water District treated water and City well-water.

These zone boundaries have been adjusted over the years, depending on increases or decreases in water demand within these zones and the ability of the distribution system to maintain these predetermined delivery pressures. The purpose of creating pressure zones is to maintain both minimum and maximum pressures within the zone boundaries. Typically, a minimum pressure in any zone would not drop below 40 pounds per square inch (psi) or exceed 105 psi. Water can flow between zones through pressure regulating valves located at the boundaries. These regulating valves are equipped with a reverse flow feature that senses differential pressure from the zones and will automatically respond to maintain the preset pressures.

For the most part, the northern portion of the City (Zone I) is serviced by pressure directly from the Hetch Hetchy pipeline system, which operates in excess of 130 psi. Booster pumps are required for Zones II and III to maintain an adequate distribution and delivery pressure, since water is pumped out of the storage reservoirs into the distribution network.

Within the City's service areas, there are pocketed areas located adjacent to Fremont Avenue and Sunnyvale-Saratoga Road that receive water from the California Water Service Company (Cal Water). These areas were formerly part of the county, but have been annexed by Sunnyvale. Cal Water produces water from their own wells, which meets all federal and state quality requirements. Sunnyvale's water rates are lower than Cal Water's rates. The City has provided emergency connection to Cal Water service areas to improve fire flows and reliability. All fire hydrants have been replaced to conform to City standards. Should the opportunity present itself for the City to acquire service areas from Cal Water, a feasibility study would need to be conducted.

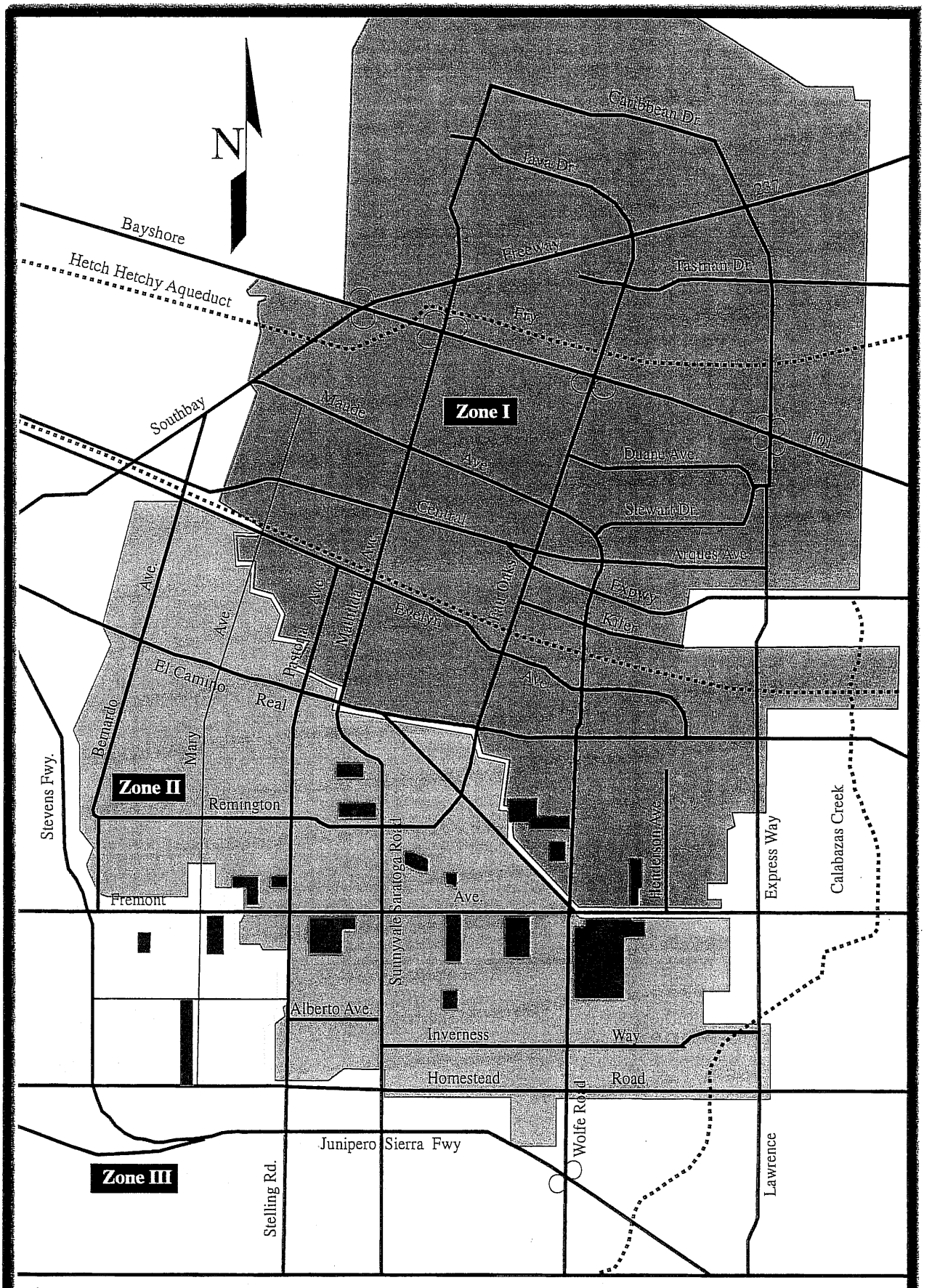


FIGURE 1. WATER SERVICE AREA

Water Distribution System

The City of Sunnyvale owns, operates, and maintains a water supply and distribution system worth in excess of $200 million. The system includes tie-ins with its suppliers and neighboring water utilities, transmission pipelines, distribution pipelines, valves and regulators, fire hydrants, storage reservoirs, booster pumps, backflow devices, service lines, water meters and vaults, water sampling stations, a supervisory control and data acquisition (SCADA) system, wells, and miscellaneous buildings and appurtenances. The major water supply and distribution facilities of the City's system in 1996 are:

Water mains (4 to 30 inches), miles	282
Storage tanks	10
capacity of, mg:	27.5
Active wells	8
capacity of, mgd:	12.1
Water services	27,700
Fire hydrants	3,280
Booster pumps	17
Gate valves	10,000
Pressure regulating valves	70
City-owned backflow devices	240
Outside water connections	18

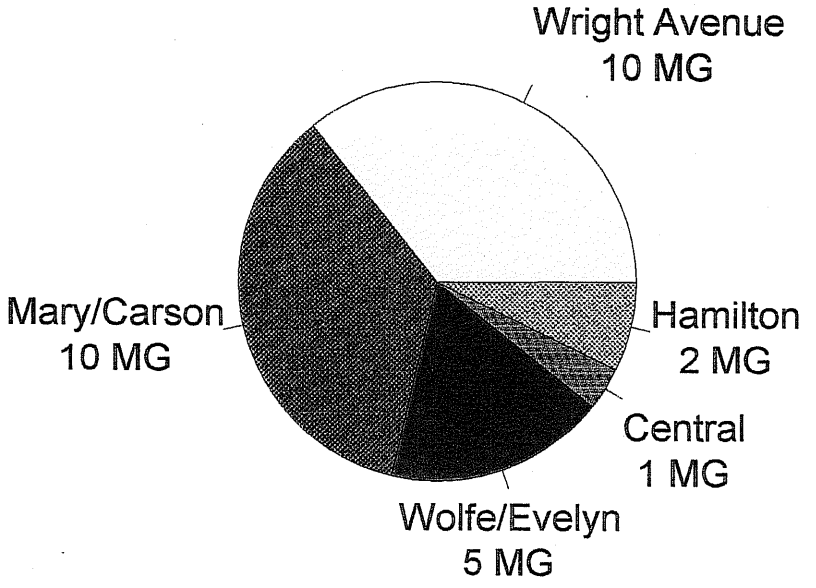
The City's reservoir sites with their storage and pumping capacity are shown in the graph on the following page.

The total capacity of the storage tanks would provide approximately one day's average usage. A 1995 hydraulic analysis of the City's water system prepared by Metcalf and Eddy, Inc., indicated that the existing storage facilities are adequate for both current and future needs through the year 2005, except for prolonged interruptions due to earthquake or other unexpected situations. The State Department of Health Services (DHS) found that many suburban utilities do not have adequate storage capacity to meet their demands during peak water use periods. A seven-day storage capacity has been suggested by DHS to provide for periods of emergency such as a major earthquake event. The costs associated with this increase in storage capacity would be significant. The ability to access this additional storage during times of emergency would depend upon the condition of the distribution system.

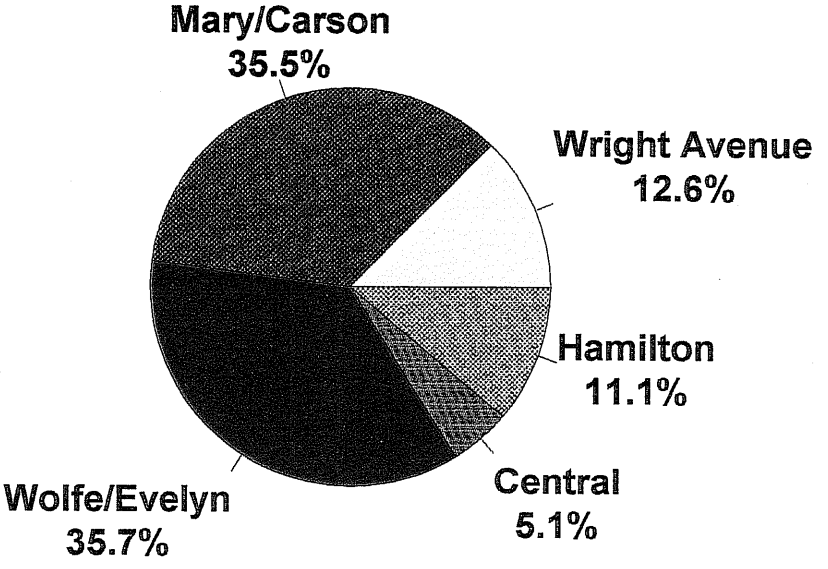
To evaluate the adequacy of the fire water supply, current and future maximum summer day demands were analyzed for both residential and industrial areas with two pumper trucks working in each case. From this analysis, the fire water supply at the selected locations was adequate.

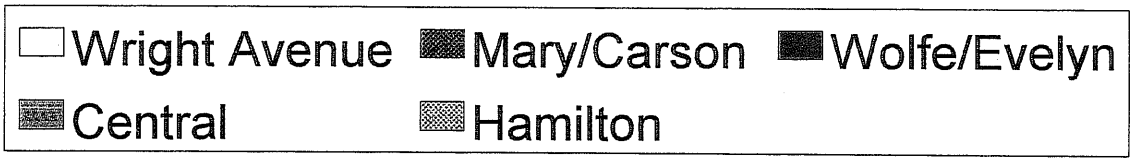
Reservoir Site Storage and Pump Capacities

Storage Capacity



Pump Capacity





The City's service ability under emergency conditions (when one of the sources is interrupted) was also evaluated for high consumption periods. Without the wells, service would be provided to all of the City's customers with adequate pressures. Without two of the six SFWD connections, service would be provided without appreciable pressure differences in Zone I. If all six of the SFWD connections were lost, pressures would decrease by 50% in Zones I and II with minimum pressures as low as 20 to 30 psi, which is sufficient pressure according to national AWWA guidelines. The scheduled Wolfe-Homestead transmission main is required to maintain desirable pressures under emergency conditions. Without the SCVWD connections, Zone III can be supplied by the Wright Avenue plant pumps. The Wright tanks can supply Zone III for approximately eight days. Water from Zone III wells could be diverted to the Wright tanks before storage is depleted.

The distribution network consists of transmission and distribution mains totalling approximately 280 miles in length, with pipe sizes varying from 4 to 30 inches in diameter. Some 10,000 gate valves provide the means to control and isolate sections of water mains during emergencies.

Water Meters and Services. A major component of the water supply and distribution system is the water meters inventory. The sale of water through the distribution system determines revenue for the utility. Because of the importance of these meters, a strict program to maintain their accuracy is conducted on an on-going basis to maintain a high level of service regarding meter accuracy. The City maintains an aggressive testing, repair, and replacement program for all of its water meters. Accurate meters also allow the City to measure overall water losses in the system. Production versus consumption records will show if losses are occurring. If significant unexplained losses occur, leaks or other losses may be occurring in the system, which will lead the utility staff to investigate.

Fire Hydrants. At the end of 1995, there were approximately 3,300 fire hydrants disbursed around the City. The location and spacing of these hydrants are coordinated through the Fire Prevention Division of the Public Safety Department. A continuous maintenance program provides flow testing, cleaning, painting, and color coding to indicate flow rates.

Backflow Devices. Backflow is a process whereby contaminated water flows from a property back to the water distribution system as a result of loss of pressure in the water mains. In 1967, the City Council adopted an ordinance to properly implement Title 17 of the California Code of Regulations (COR). These laws were adopted for the purpose of protecting the public water supply against actual or potential cross-connection by isolating within the premises contamination that could occur because of some undiscovered or unauthorized cross-connection. The City, acting as the water purveyor, has primary responsibility to prevent contaminated water from entering the public water supply system. The backflow protection is provided by an owner-installed approved device, subject to inspection and testing on an annual basis. Because of the absolute importance of maintaining these devices properly, City staff will be investigating the possibility of acquiring ownership of all backflow devices in the City to ensure that these devices function properly.